

**REMARKS**

By this amendment, the Applicant cancels claim 2 and adds new claim 54. Claims 5, 6, 8-53 are withdrawn from consideration. Therefore claims 1, 3-4, 7 and 54 are all the claims pending in this application.

Claim 7 has been amended to now depend from claim 1. The applicant respectfully submits that the amended claim 7 reads on the elected species. Therefore, the Examiner is requested to rescind the withdrawal of claim 7.

Claims 1 and 2 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Nakamura et al (JP 08-187868).

Claims 3 and 4 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura et al (JP 08-187868) in view of Usui et al (6,158,847).

The applicant traverses the rejections and requests reconsideration.

The present invention, as recited in claim 1, requires a plate-shaped member that includes a first layer, a second layer and an intermediate layer sandwiched between the first and second layers. A partition wall is formed by a first etching process which etches a desired portion of the first layer selectively over the intermediate layer so that the first layer is penetrated. Further, a land is formed by a second etching process which etches a desired portion of the second layer selectively over the intermediate layer so that the second layer is penetrated.

The above-mentioned features are instrumental in realizing the following advantages described in the present specification.

i) The adhesive does not protrude into the pressure chamber and the ink inlet passage. Further, the accuracy of the positional relation between the pressure chamber and the

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land is improved. Therefore, the difference in ink jetting characteristics between the nozzle holes can be reduced, as described from line 37 of page 17 to line 7 of page 18.

ii) Depths of the pressure chamber and the ink inlet passage, which affects ink jetting characteristics, are defined by the thickness of the first layer. So the differences in depth (sectional area) between the pressure chambers, and between the ink inlet passages can be reduced. This further reduces the difference in ink jetting characteristics between the nozzle holes, as described in lines 8 to 16 of page 18.

None of the cited references disclose or suggest the above-mentioned characteristic features of the present invention.

Nakamura et al. (JP 08-187868) discloses an ink jet recording head having an island part 9 which is formed by etching a metal thin plate.

However, Nakamura et al. is completely silent about a plate-shaped member including a first layer, second layer and an intermediate layer sandwiched between the first and second layers, the plate-shaped member having a partition wall formed by etching the first layer of the plate-shaped member and a land formed by etching the second layer of the plate-shaped member.

Therefore, the above-mentioned advantages, which can be obtained by the present invention, cannot be obtained by the ink jet recording head disclosed in Nakamura et al.

The above-mentioned advantages of the present invention are realized due to the structure of the claimed invention. Further, the advantages are realized by etching both sides of the plate-shaped member having a tri-layered structure. Therefore, the present invention is structurally different from the ink jet recording head disclosed in Nakamura et al. The Applicant respectfully submits that the above-mentioned advantages arise due to the structural features of the present

invention which are different from the ink jet recording head disclosed in Nakamura et al.

Usui et al. (US 6,158,847) is completely silent about the above-mentioned characteristic features of the present invention as is true with Nakamura et al. A skilled artisan would not have been able to make the present invention from the suggestions of Nakamura/Usui.

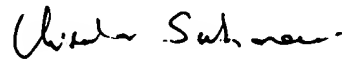
Claims 3, 4 and 7 depend on claim 1, and therefore, the arguments discussed above are analogously valid.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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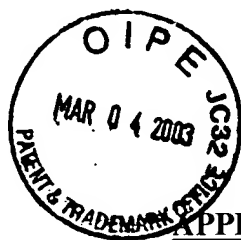
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Date: March 4, 2003



APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

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IN THE CLAIMS:

Claim 2 is cancelled.

The claims are amended as follows:

1. (ONCE AMENDED) An ink-jet recording head comprising:
a pressure producing device for changing a pressure in a pressure chamber containing an ink;
a plate-shaped member having a front surface and a back surface, the plate-shaped member having a partition wall formed on the front surface by a first etching process, the partition wall defining the pressure chamber, an ink inlet passage and a common ink storage chamber, the plate-shaped member having a land formed on the back surface by a second etching process so as to correspond to the pressure chamber and be in contact with an extremity of the pressure producing device, the plate-shaped member having an elastic and deformable portion which is formed by the first etching process and the second etching process so as to surround the land, the elastic and deformable portion being capable of being elastically deformed by a deformation of the pressure producing device; and
a nozzle plate provided with a nozzle hole through which an ink particle is jetted when the pressure in the pressure chamber is changed by the deformation of the pressure producing device, the nozzle plate being disposed on a side of the front surface of the plate-shaped member,
wherein the plate-shaped member includes a first layer having the front surface, a second layer having the back surface and an intermediate layer sandwiched between the first

layer and the second layer, and

wherein the partition wall is formed by the first etching process which etches a desired portion of the first layer selectively over the intermediate layer so that the first layer is penetrated, and the land is formed by the second etching process which etches a desired portion of the second layer selectively over the intermediate layer so that the second layer is penetrated.

3. (ONCE AMENDED) [The] An ink-jet recording head [according to claim 1,] comprising:

a pressure producing device for changing a pressure in a pressure chamber containing an ink;

a plate-shaped member having a front surface and a back surface, the plate-shaped member having a partition wall formed on the front surface by a first etching process, the partition wall defining the pressure chamber, an ink inlet passage and a common ink storage chamber, the plate-shaped member having a land formed on the back surface by a second etching process so as to correspond to the pressure chamber and be in contact with an extremity of the pressure producing device, the plate-shaped member having an elastic and deformable portion which is formed by the first etching process and the second etching process so as to surround the land, the elastic and deformable portion being capable of being elastically deformed by a deformation of the pressure producing device: and

a nozzle plate provided with a nozzle hole through which an ink particle is jetted when the pressure in the pressure chamber is changed by the deformation of the pressure producing device, the nozzle plate being disposed on a side of the front surface of the plate-shaped member,

wherein the plate-shaped member includes a first layer having the front surface, a second layer having the back surface, an intermediate layer sandwiched between the first layer and the second layer, a first adhesive layer bonding the first layer and the intermediate layer together and a second adhesive layer bonding the second layer and the intermediate layer together,

wherein the partition wall is formed by the first etching process which etches a desired portion of the first layer selectively over the first adhesive layer so that the first layer is penetrated, and the land is formed by the second etching process which etches a desired portion of the second layer selectively over the second adhesive layer so that the second layer is penetrated.

4. (ONCE AMENDED) The ink-jet recording head according to claim [2] 1, wherein the first and the second layers are formed of a stainless steel, and the intermediate layer is formed of a polymer film.

7. (ONCE AMENDED) An ink-jet recording head [comprising:] according to claim 1,

[a pressure producing device for changing a pressure in a pressure chamber containing an ink;

a plate-shaped member having a front surface, a back surface, the plate-shaped member having a partition wall formed on the front surface, the partition wall defining the pressure chamber, an ink inlet passage and a common ink storage chamber, the plate-shaped member having a land formed on the back surface so as to correspond to the pressure chamber and be in

contact with an extremity of the pressure producing device, the plate-shaped member having an elastic and deformable portion surrounding the land and being capable of being elastically deformed by a deformation of the pressure producing device, the plate-shaped member including a first layer having the front surface, a second layer having the back surface, and an intermediate layer sandwiched between the first and the second layers, and]

wherein the plate-shaped member does not [having] have any adhesive layer or the like between the first and the intermediate layers nor between the second and the intermediate layers [; and

a nozzle plate provided with a nozzle hole through which an ink particle is jetted when the pressure in the pressure chamber is changed by a deformation of the pressure producing device, the nozzle plate being disposed on a side of the front surface of the plate-shaped member].

Claim 54 is added as a new claim.

54. (NEW) The ink-jet recording head according to claim 3 wherein the first and the second layers are formed of a stainless steel, and the intermediate layer is formed of a polymer film.

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-- PRIOR ART --

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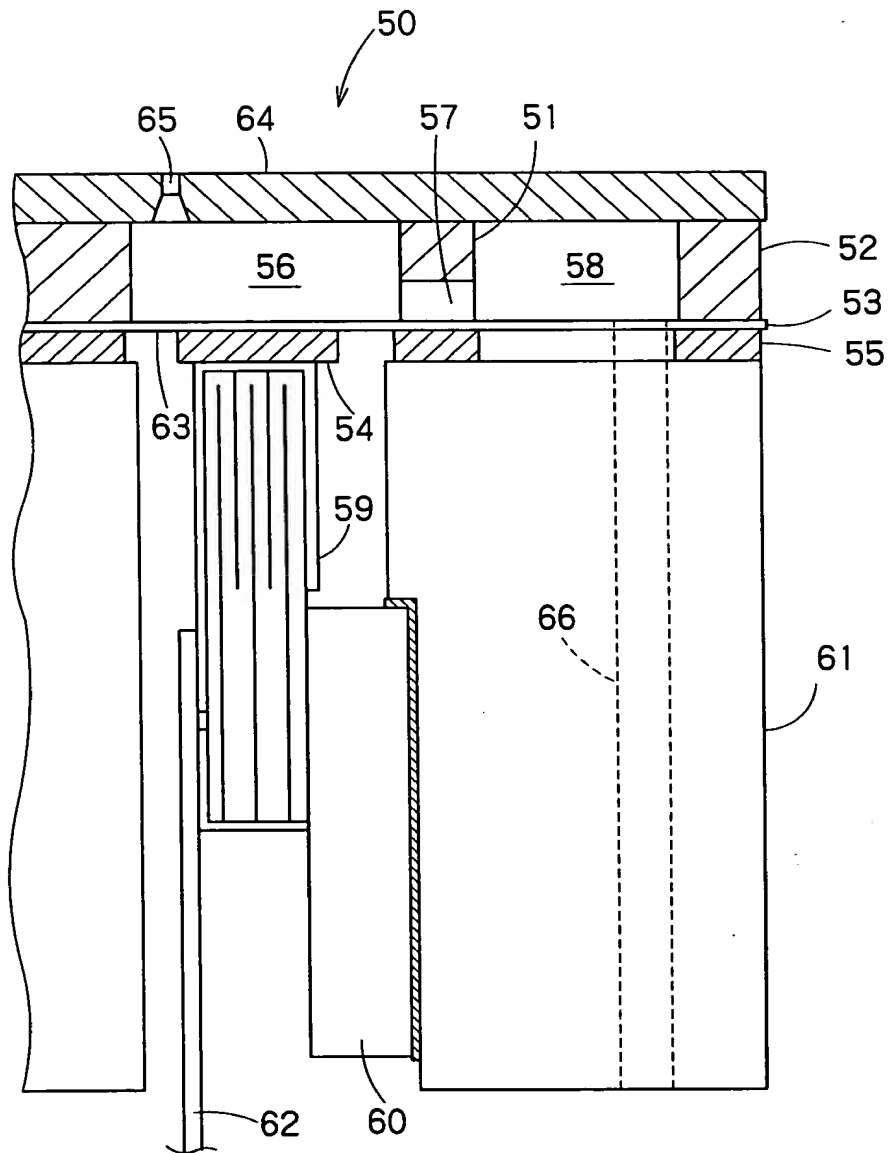


FIG. 30

-- PRIOR ART --

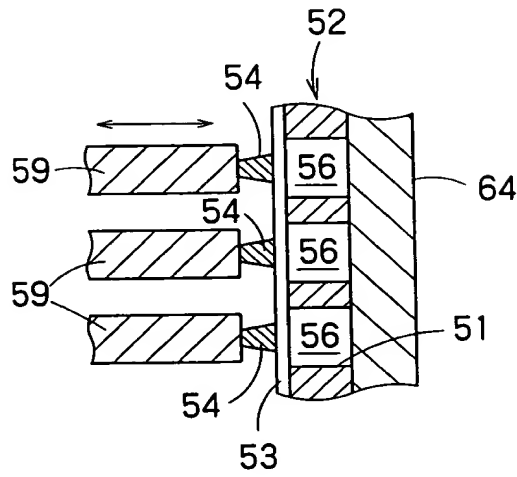


FIG. 31

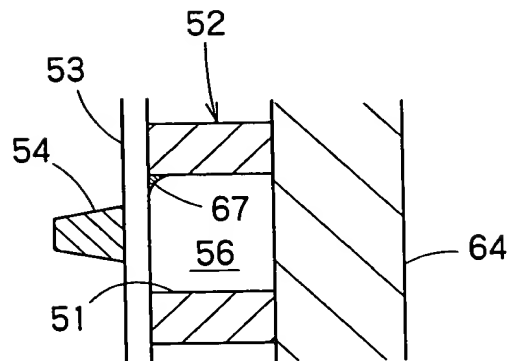


FIG. 32



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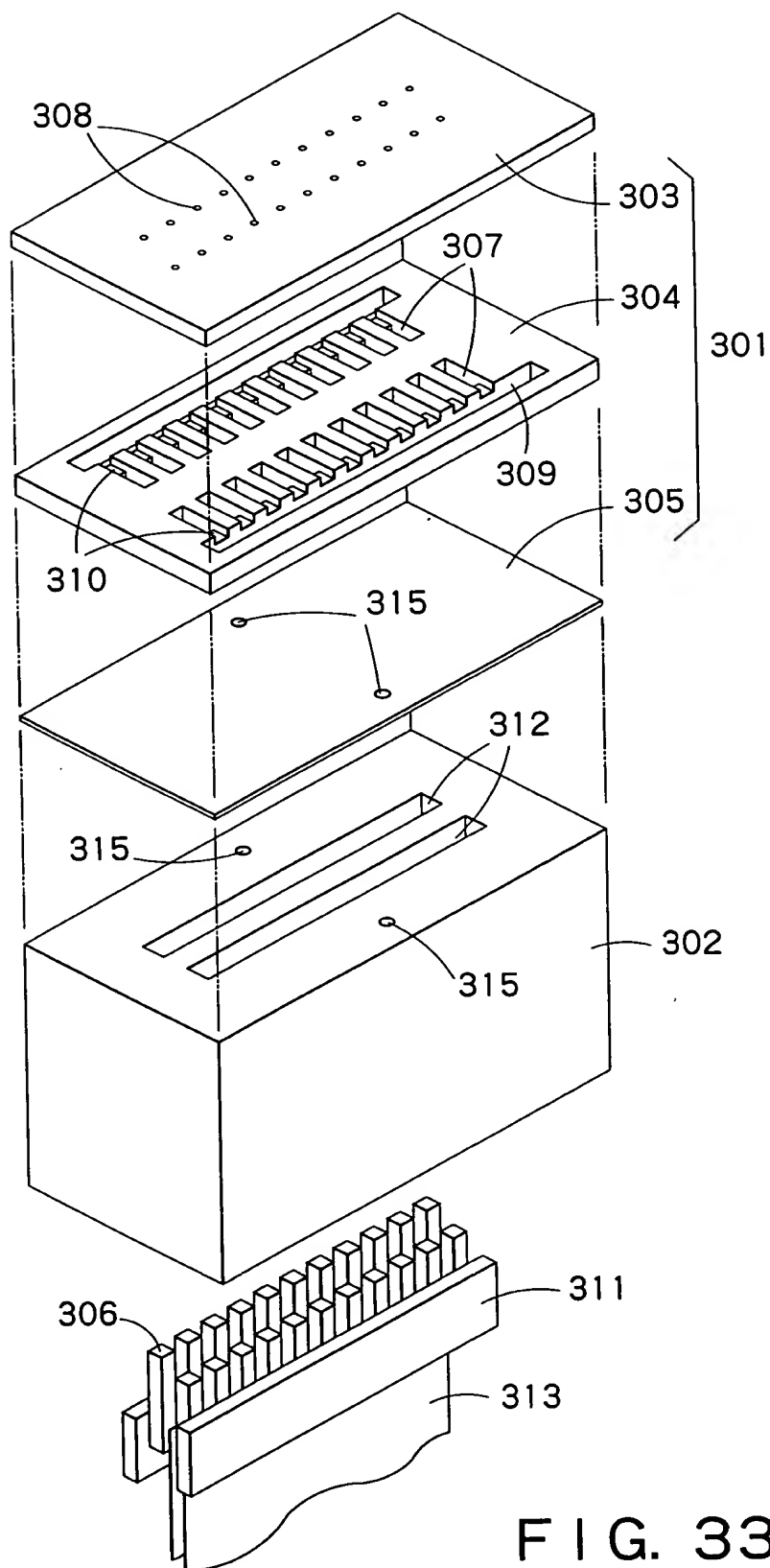


FIG. 33



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-- PRIOR ART --

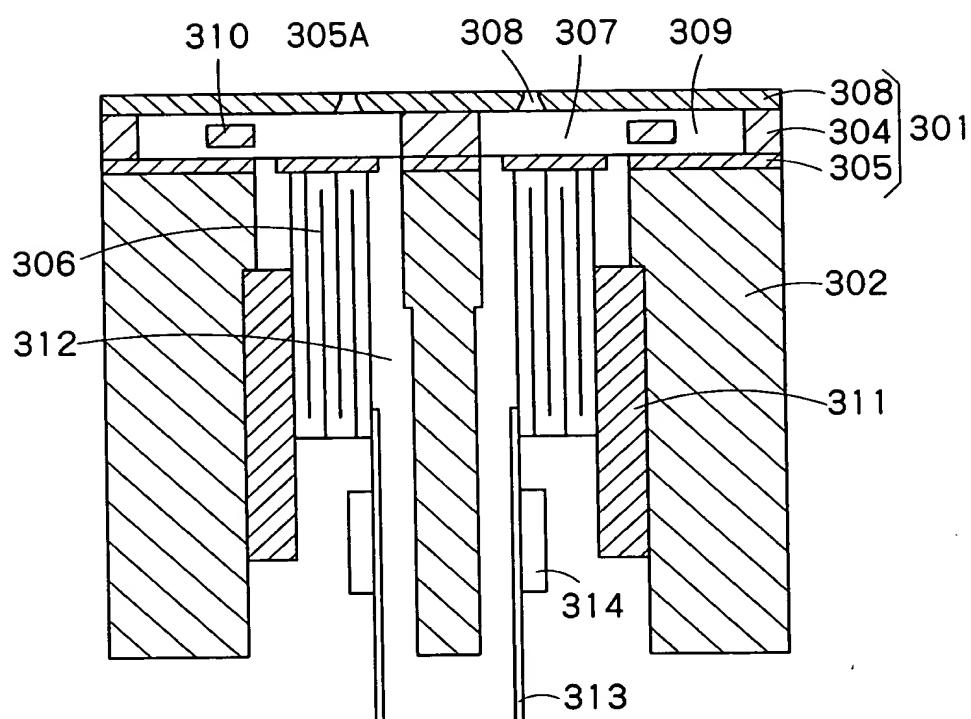


FIG. 34